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THE GARDEN CALENDAR

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A radio discussion by C. A. Magoon and W. R. Beattie, Bureau of Plant Industry, delivered in the Department of Agriculture period of the National Farm and Home Hour, broadcast by a network of 48 associate NBC radio stations, Tuesday, September 6, 1932.

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ANNOUNCER:

In our garden calendar period today Dr. C. A. Magoon and Mr. W. R. Beattie of the Bureau of Plant Industry are going to bring us some facts from recent scientific research on how to make sure of canning high quality corn. Every one of you who buys canned goods or can them at home has found vast differences in the quality of the canned products. Now we are to hear why some of these differences occur. How about it, Mr. Beattie?

BEATTIE:

It is true, Mr. Salisbury, there are some most decided differences in the quality of canned products, especially canned sweet corn and peas. About ten years ago Dr. Magoon and Mr. Culpepper, who is associated with Dr. Magoon in his work, began a careful investigation of the underlying causes of poor quality in canned corn. I am sure that Mr. Magoon who is sitting at the opposite side of the table from me, will fully agree with me in the statement that I am about to make. It is this -- canning does not improve quality and you need not expect to get a better product out of the can than you put into it. Isn't that right, Mr. Magoon?

MAGOON:

Exactly so. If you want quality canned goods you must have the quality in your raw materials. The canning process does not improve the quality except as it may affect flavor by the addition of salt, sugar, and flavoring materials.

BEATTIE:

Mr. Magoon, I believe we decided to talk mainly about sweet corn for canning today, so I brought some samples of canned corn with me. I'd like for you to look at the contents of this can of corn and then tell us what you think of its quality.

MAGOON: (Three or four seconds pause)

Well, Mr. Beattie, I'd say that the corn was overmature when it was gathered for canning.

BEATTIE:

Exactly what I thought. Now is it not true that the degree of maturity is one of the most important, if not the most important factor, in determining the quality of canned sweet corn?

MAGOON:

Yes, the degree of maturity is of prime importance. The main point is to gather the corn just at the time that it is in prime condition for canning. This corn was evidently somewhat overmature when it was gathered.

BEATTIE:

I presume the variety or kind of corn has considerable to do with the quality of the canned product?

(over)

MAGOON:

Oh yes. The kind of corn is important. Only the sweet varieties are suitable for canning -- the field corns give a very inferior product. A large number of varieties of sweet corn are being grown for canning but most of our commercially canned product consists of about four or five varieties. These are Stowell's Evergreen, Narrow-Grained Evergreen, Country Gentleman, Golden Bantam and Crosby. Different sections of the country go in for different varieties but Stowell's Evergreen and Country Gentleman probably constitute the bulk of the canned corn.

BEATTIE:

In your investigations, Magoon, did you test a large number of varieties in order to determine which gave the best quality canned corn?

MAGOON:

Yes, Beattie, we experimented with seventeen varieties, including two of field corn. We kept records on their rate of maturing, we tested them for the toughness of kernel at the different stages, and we made chemical analyses of the kernels at different stages. Another thing we did was to determine the comparative yield of the different varieties in cut corn per ton.

BEATTIE:

What varieties gave you the highest yields of cut corn suitable for canning?

MAGOON:

Stowell's Evergreen and Country Gentleman. Other varieties that gave good yields of cut corn were Morse's Golden Cream, Narrow-grained Evergreen, and Old Colony. Of the earlier varieties, Crosby, Dreer's Golden Giant, and Charlevoix gave fair cuts though these were considerably below Country Gentleman.

BEATTIE:

Magoon, you mentioned that you tested the different corns for toughness of kernel at different stages. Tell us, how important is tenderness to the quality of the canned product?

MAGOON:

It is very important indeed. While flavor and consistency are important factors as influencing the quality of canned corn, tenderness or toughness of kernel is of even greater importance.

BEATTIE:

How did you test the kernels for toughness or tenderness? I know how I used to test corn when I was a boy and my mother sent me to the sweet corn patch to get the corn for our dinner; I slit back the husks and tested the kernels with my thumb-nail.

MAGOON: (laughing)

I suppose that is the way the Indians tested the kernels, too, but the thumb-nail test is not very reliable. We use a mechanical device that registers the resistance of the pericarp to puncture. Pericarp is what we call the skin or covering of the kernels. This test shows a direct increase in the resistance to puncture as the kernels become more mature.

BEATTIE:

Right here is where we need television in order to show you folks this

73-

ingenious little device for testing the tenderness of the kernels of corn, but I'll try to describe it. The tester consists of a glass tube containing a steel spring and a plunger with a blunt needle fitted to the end of the plunger. In use the needle is pressed against the kernel of corn and the number of grams pressure required to puncture the kernel is noted. Is that not right, Mr. Magoon?

MAGOON:

Yes, that's correct. We used this instrument right through the season, making many of the tests in the field. We tested 30 or 40 kernels on each ear, selecting those at the butt, in the middle and at the tip of each ear. We made the first test 10 days after the ears formed silk and then at 5-day intervals for the next 30 days.

BEATTIE:

Does the puncture test tell you anything else?

MAGOON:

Yes, it shows us that some varieties are naturally more tender than others, and that it is possible to breed tender corn. It also shows us that corn remains in prime canning condition for only a short time -- not more than 3 or 4 days in most cases. The period varies somewhat in different sections of the country. Maturity advances more rapidly in the South than in the North, and faster during hot weather than during cool.

BEATTIE:

Do you find that there is a relation between the tenderness of the kernels and the chemical composition of the corn?

MAGOON:

Yes we do. There is a definite relationship between maturity and the sugars, starch, dextrins, etc. that go to make up the kernel contents. If the corn is undermature the product is watery and lacking in flavor and body. If the corn is overmature there is an excess of starch at the expense of flavor and quality. As the corn becomes more mature the sugar content decreases.

BEATTIE:

What period of maturity do you find to be the best in order to produce the highest all-round quality of canned sweet corn?

MAGOON:

Well, we find that on the average, in the region of Washington, D. C., corn picked for canning about 20 days after the silks form yields a better canned product than corn picked at any other stage. This period will vary in different parts of the country.

BEATTIE:

What other factors besides stage of maturity do you find affecting the quality of corn used for canning?

MAGOON:

Well, for one thing, promptness of handling. Corn on the ear undergoes very rapid deterioration after it has been taken from the plant in the field, and the rapidity of this deterioration depends to a great extent on the prevailing

temperature. If the freshly gathered corn is placed at once in a refrigerator the change is not very rapid, but if the ears are laid in the sun or held in a warm room the change is very rapid.

BEATTIE:

What do you mean by very rapid?

MAGOON:

Experiment shows that when the harvested ears are held at ordinary room temperature, a quarter of the sugar present in it disappears within the first 24 hours, and the sugar continues to decrease with further holding. In the case of corn held at 86 degrees one-half of the sugar is lost during the first 24 hours. Loss in desirable flavors and other properties also occur.

BEATTIE:

If that is the case I should think the practice of some growers of picking the corn and holding it in the wagon-box over night or for a considerable period before delivering it to the factory would be bad for the quality. Also the holding of the corn in large piles in the factory sheds before it is canned would result in loss of quality. Is that true?

MAGOON:

Indeed yes. Corn held in this manner becomes hot in the mass or pile, or heats as we say, and it loses its quality very rapidly.

BEATTIE:

That old saying, "Out of the garden and over the fire" really does apply to the handling of sweet corn especially, doesn't it?

MAGOON:

Yes, prompt handling is very important. To begin with the sweet corn growers can assist in producing better quality of the pack by gathering their corn at just the right stage of maturity and delivering it promptly. The canners can then be assured of good quality by properly canning the corn without delay. Home canners may easily have their corn in the cans and processed within four or five hours after it is gathered.

BEATTIE:

Now, Mr. Magoon, as a result of your studies what variety of sweet corn would you say gives the best quality of canned corn?

MAGOON:

Well, I would say that a first-quality canned product can be made from any variety of sweet corn provided the canning is done when the crop is at the proper stage of maturity. We have blindfolded experts, then fed them with corn from the different varieties and they were not able to tell the difference.

BEATTIE:

Then you would say that the important points is to grow a good vigorous crop of sweet corn and then can it at exactly the right stage of maturity.

MAGOON: That's what we found in our experiments.

BEATTIE: Thank you, Mr. Magoon. And now, Mr. Salisbury and members of the Farm and Home Hour audience, that concludes our inquiry into the causes of poor quality of the sample can of corn here before us and likewise of thousands of cans of corn that are being canned from corn that is overmature.